IPETRONIK

PlugIn-Concept –
Open To Everything

IPEmotion PlugIn
IPETRONIK CAN

User manual

![IPETRONIK logo]

Content

1 Important information

Please follow these instructions before and during the use and application of any IPETRONIK product!

1.1 Liability, Warranty, Copyright, License agreement

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2 General information

2.1 About this manual

The manual *IPEmotion PlugIn IPETRONIK CAN* describes the structure of the PlugIn and how to use the features for configuring devices, which are based on the IPETRONIK CAN driver, in IPEmotion, taking acquisitions and managing and analyzing the resulting data.

Please read the manual *IPEmotion PlugIn IPETRONIK CAN* carefully to get to know the operating and to learn more about the functions and special features. This manual also contains information for installing and removing the software.

2.2 Version

2.2.1 User manual IPEmotion PlugIn IPETRONIK CAN

This manual has the version number 01.06.

2.2.2 IPEmotion PlugIn IPETRONIK CAN

The descriptions in this documentation refer to the current release with the version number 01.06.

2.2.3 IPEmotion

The descriptions in this documentation refer to the current release with the version number 01.09.

(i)	*The PlugIn requires at least IPEmotion V01.00 on your computer.*

2.3 Legend of the used icons

(tip)	*Tip*	*This icon indicates a useful tip that facilitates the application of the software.*

(i)	*Information*	*This icon indicates additional information for a better understanding.*

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⚠	*Attention!*	*This icon indicates important information to avoid potential error messages.*

2.4 Support

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Management: Erich Rudolf, Andreas Wocke

Technical support and product information

www.ipetronik.com   e-mail: support@ipetronik.com

2.5 Related documentations

2.5.1 IPEmotion

The documentation IPEmotion.pdf provides you with a description and useful information related to IPEmotion. This documentation is stored in the following standard language dependent directory: C:\Programs\IPETRONIK\IPEmotion Vxx.xx.xx\Help.

2.5.2 Manual MAL development

The documentation MAL development.pdf provides you with a description and useful information related to the use of the interface with plug-in components and IPEmotion.

2.5.3 Engine compartment measurement

The documentation Engine_Compart_Measurement.pdf provides you with a description and useful information related to the IPETRONIK M devices.

2.5.4 Vehicle measurement

The documentation Vehicle_Measurement.pdf provides you with a description and useful information related to the IPETRONIK SIM devices.

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Please note that this documentation is currently only available in German.

2.6 Documentation feedback

At IPETRONIK, the technical publications team strives to produce documentations of the highest quality and values your feedback as a reader and user. If you have any comments or suggestions regarding our product manuals, contact us under support@ipetronik.com.

Please inform us about the following points:

- Version number (Select *Options → Add Ins* from the menu to display the version number.),

- Name of the guide,

- Page number or section title,

- Brief description of the content (e.g. inaccurate instructions, grammatical errors, or information that require clarification),

- Any suggestions for a general documentation improvement.

3 Introduction

The IPETRONIK CAN PlugIn offers you the ability to use M and SIM devices of IPETRONIK within IPEmotion.

The devices of the IPETRONIK CAN system are separated into groups according their functionality. The current version supports the following four component groups:

- Voltage/current
- Temperature
- Pressure
- Counter/frequency
- Communication
- Multi devices

Each single group contains different devices, which can be used for acquiring data. Each device is an independent acquisition system and can be used as a stand-alone devices, as well as, in combination with other devices in a CAN bus network. The current IPEmotion PlugIn IPETRONIK CAN version offers the following devices (they are listed accordingly to the above classification):

- Voltage/current:
    - M-SENS
    - M-SENS DSP
    - M-SENS 8
    - M-SENS 8 DSP
    - M-SENS 8plus
    - M-SENS 8plus DSP
    - SIM-SENS
    - SIM-SENS DSP
    - SIM-VIN
    - SIM-VOUT
    - SIM-STG
    - SIM-DMS

- SIM-DMS DSP
- Temperature:
  - Mc-THERMO
  - M-THERMO
  - M-THERMO2
  - M-THERMO2 u
  - M-THERMO 16
  - M-THERMO T
  - M-THERMO T16
  - M-RTD2
  - µ-THERMO
  - SIM-TH II-8
  - SIM-TH II-16
  - SIM-THERMO
  - SIM-TH II-8N
  - SIM-PT100
  - SIM-PT200
- Pressure:
  - CANpressure ABS 1, 2, 5, 10, 20, 25, 30, 50, 100, 200, 250 Bar
  - CANpressure REL 1, 2, 5, 10, 20, 25, 30, 50, 100, 200, 250 Bar
- Counter/frequency:
  - M-FRQ
  - SIM-CNT
- Communication:
  - SIM-ECU 552, 553, 554
  - SIM-SER

        SIM-ECU552[120], SIM-ECU553[120], SIM-ECU554[ECU]

        SIM-SER[16]

Multi devices

        MultiDAQ

Each single device provides channels.

> *Please find detailed information about the M and SIM devices of IPETRONIK in the manuals Engine_Compart_Measurement and Vehicle_Measurement.*

4 Setting up and removing

4.1 System requirements

The minimum hardware and platform requirements for the application of the IPEmotion PlugIn IPETRONIK CAN are outlined below.

4.1.1 Hardware

The minimum hardware requirements correspond to those of IPEmotion.

4.1.2 Platforms

The IPEmotion PlugIn IPETRONIK CAN can be run under the following operating systems:

- Windows XP (32 Bit),

- Windows Vista (32 Bit).

4.2 Installing IPEmotion PlugIn IPETRONIK CAN

The following chapter guides you through the installation process of the IPETRONIK CAN PlugIn.

> ⚠️ *IPEmotion PlugIn IPETRONIK CAN needs administrator rights during the installation. For working with the PlugIn you need at least limited user's or default user's rights (Vista).*

The installation of IPEmotion PlugIn IPETRONIK CAN is based on an installation wizard that guides you through the setup process step by step. You can start the installation wizard from the USB flash drive or, if you have downloaded the setup program from the IPEmotion forum at www.ipemotion.com, from the setup file itself.

To install IPEmotion PlugIn IPETRONIK CAN:

1. Start the installation wizard from the USB flash drive or from the setup file.

💾 *USB flash drive:* Connect the USB flash drive to the USB port of your computer and follow the instructions of the installation wizard.

💾 *Setup file*: Browse the location of the setup file and double-click **IPEmotion PlugIn IPETRONIK CAN.exe** to start the installation wizard.

> 💡 *Depending on the used PC operating system, a security warning appears. Click **Run** to start the installation wizard.*

2. Setup language/Setup-Sprache/Langue d'installation: Select the language for the installation process. You can choose between the languages German (Germany), English (USA), and French (France).
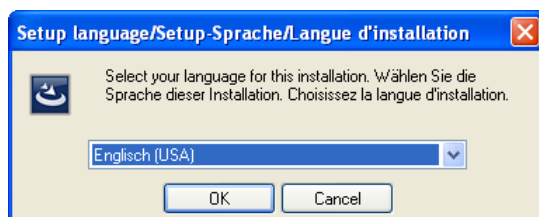
Click **OK** to start the IPETRONIK CAN installation wizard.

3. Welcome screen: This is the first screen in the IPEmotion PlugIn IPETRONIK CAN installation wizard.

Click **Next** to continue.

4. Destination folder:

> Due to the security model of Microsoft Corporation related to .NET applications, the installation of IPEmotion PlugIn IPETRONIK CAN on a local drive is recommended.

> According to the Microsoft conformance guidelines for Windows applications the files are installed to the default locations that are specific to the operating system and language.

Accept the default installation location for IPEmotion PlugIn IPETRONIK CAN. To select another location click **Change**.

After you have specified the location for the installation, click **OK** to return to the **Destination folder** screen.

Click **Next** to continue.

5. Ready to install the program: This screen indicates that IPEmotion PlugIn IPETRONIK CAN is ready to install.

Click **Install** to start the installation.

6. Installing: A progress bar is shown during the installation process.

7. InstallShiel Wizard Completed: After the successful installation, the following screen is shown.

Click **Finish** to exit the installation wizard.

> A Windows-Silent-Setup cannot run other setups in silent mode, the plugin must therefore be installed as silent, too:
> Setup IPEmotion PlugIn IPETRONIK CAN.exe /S /v/qn
>
> CAN-PlugIn setup copies CAN-Server into Temp directory and installs CAN-Server in Silent mode, which must also be installed separately:
> msiexec /i ".../IPETRONIK CAN-Server.msi"/qn

4.3 Uninstalling IPEmotion PlugIn IPETRONIK CAN

The following chapter shows the deinstallation process of IPEmotion PlugIn IPETRONIK CAN.

For removing IPEmotion PlugIn IPETRONIK CAN you have two possibilities:

- The option **Remove** of the IPEmotion PlugIn IPETRONIK CAN installation program

- The option **Add or Remove Programs** for IPEmotion PlugIn IPETRONIK CAN in the Control Panel.

With both methods you can remove files, folders and registry entries from your computer, which has been created during the installation.

Removing IPEmotion PlugIn IPETRONIK CAN with the installation program

To do so, proceed as follows:

1. Click in the menu **Start** on your computer on **Settings** and then **Control Panel**.

2. Double-click in the **Control Panel** on **Add or Remove Programs.**

3. Select from the program list the entry **IPEmotion PlugIn IPETRONIK CAN** and click **Change** to start the installation wizard.

Click **Next** to advance to the **Program maintenance** screen.

4. Program maintenance: This screen allows you to modify, repair or remove IPEmotion PlugIn IPETRONIK CAN. Select **Remove** and click **Next** to continue.

5. Remove the program: This screen indicates that your installation is now ready to remove. Click **Remove** to start the removing process.

6. Uninstalling: A progress bar is shown during the uninstalling process.

7. InstallShiel Wizard Completed: This screen is shown after the successful deinstallation. Click **Finish** to exit the installation wizard.

After removal, IPEmotion PlugIn IPETRONIK CAN is no longer indicated in the program list.

Removing IPEmotion PlugIn IPETRONIK CAN with the deinstallation function of the Control Panel

To do so, proceed as follows:

1. Click in the menu **Start** on your computer on **Settings** and then **Control Panel**.

2. Double-click in the **Control Panel** on **Add or Remove Programs.**

3. Select from the program list the entry **IPEmotion PlugIn IPETRONIK CAN** and click **Remove** to start the installation wizard.

4. Click **Yes** to start the deinstallation.

5. A progress bar is shown during the uninstalling process.

After the successful removal of IPEmotion PlugIn IPETRONIK CAN, the program has been removed from your computer and is no longer indicated in the program list.
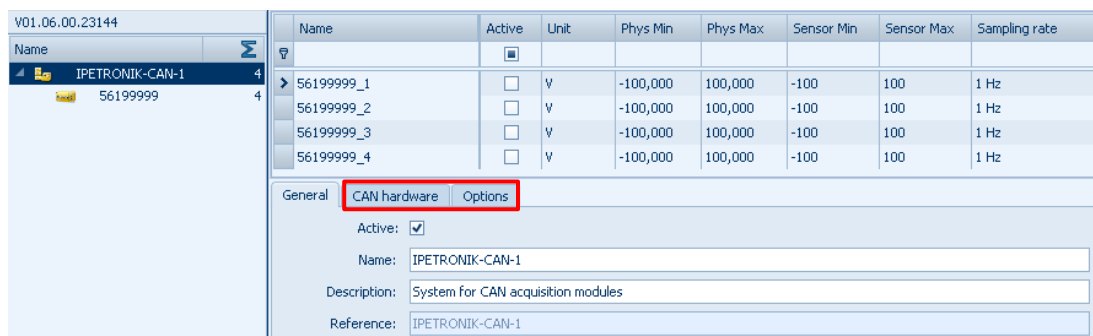
5 Working with IPEmotion PlugIn IPETRONIK CAN

The following chapter offers an overview of the available commands and their functions. In addition, it is shown how to use the IPETRONIK CAN devices and the software IPEmotion for configuring and acquiring data, as well as, managing and analyzing the acquired data.

5.1 Defining general settings

The main navigation tab **Signals** contains all available and connected systems with the respective type description and channels. Click on the button *Add system* or *Add component* to expand the configuration by further systems or components.

IPEmotion **Options** 🔧 -> **PlugIns** offers you the ability to define up to 4 interfaces for detecting.

Open the **Options** tab and activate the desired interfaces and the corresponding medium and CAN bus within the **Hardware detection interfaces** section.

To define the general settings for the **system properties**, proceed as follows:

> ℹ️ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General.*

ℹ️ Select in the left tree view the desired system. You can find the **CAN hardware** tab in the window of the configuration dialog. You can set the following configuration definitions:

   ℹ️   Medium

The medium defines the interface to the acquisition system. The CAN medium already found by the driver is shown automatically.

   ℹ️   CAN bus

The IPEmotion parameter CAN bus defines the CAN channel, where the devices are connected to and which is used by the devices for communicating.

      Baud rate

The baud rate defines the transfer rate, which is valid for all system devices, for communicating to the devices.

      Device baud rate

      Baud rate initialization

Activate or deactivate the use of the baud rate at the interface initialization.

The **Options** tab offers the following configuration possibilities:

      Synchronized mode

Activate or deactivate the use of the synchronized Free Running mode. The PlugIn defines a device as clock generator (Master), which sets the acquisition clock for all connected devices (Slave). All devices of an acquisition system have a synchronized internal clock.

      Automatic CAN ID placing

Activate or deactivate the automatic assigning of the CAN parameters.

      Start CAN-ID

Define the start CAN-ID for the automatic CAN-ID assignation.

      Names out of serial numbers

Create the names of the devices and channels out of the serial numbers.

5.2 The export function

The CANdb export allows you to save the configuration in a CANdb description file. If you want to create a CANdb description file from the complete system, you get a file in the ZIP format, which includes all CANdb files of the devices.
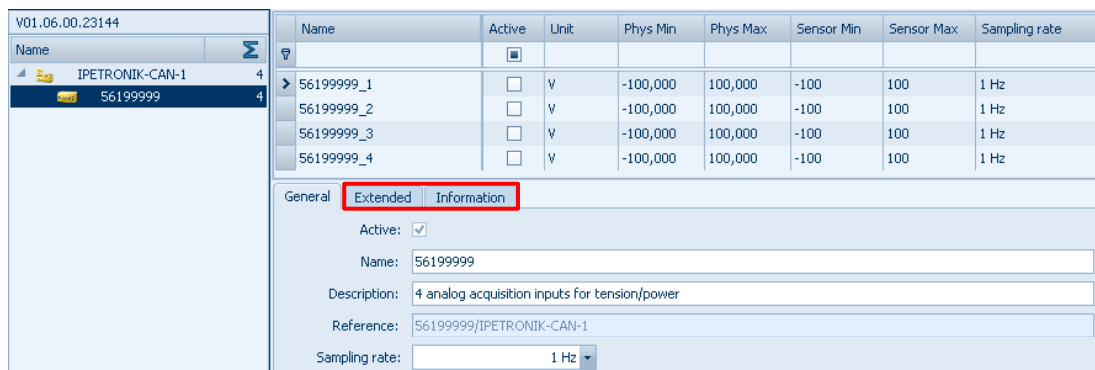
Select the desired system and click on the **Export** button or open the context menu with the right mouse button. Select the signal export into a **CANdb file** or **XML CANdb file** .
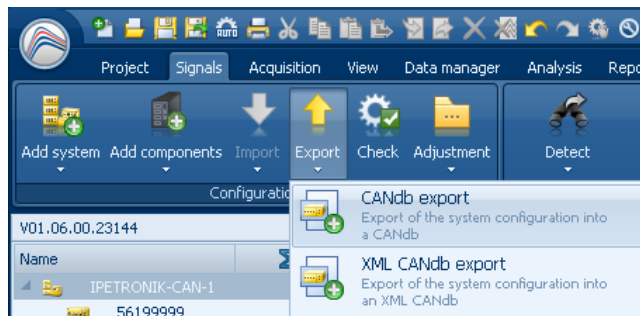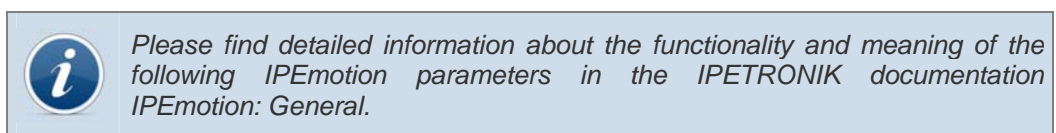
▪ᴇ The dialog window **Save file as** will be initialized. Select the desired location and confirm with **Save**.

5.3 Defining components

To define the general settings for the **device properties**, proceed as follows:

> ⓘ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General.*

▪ᴇ Select in the left tree view the desired device. You can find the **Extended** tab in the window of the configuration dialog. You have the ability to select the following properties:

▪ᴇ Front number

The front number defines the last digits of the device number. It refers to the last five digits of the serial number by default. The serial number is mandatory for detecting, using, and distinguishing the device from others within IPEmotion. The serial number is composed of the front number and the device type and can generally be found at the back of the device or is detected automatically in IPEmotion.

▪ᴇ Clock

The clock defines the acquisition clock by using an internal clock generator or another system device. You can synchronize the data acquisition of the devices.

▪ᴇ Channel balance

Activate or deactivate the offset compensation of the acquisition chain, i.e. the initial excitation compensation at switching-on. Set the acquisition value to a defined value.

29-bit identifier

Activate or deactivate the extension of the address range from 11 bit to 29 bit.

Ignore the device

Activate or deactivate this function to ignore single devices. It is not necessary to delete the device from the configuration because it is not addressed at initializing. This function allows you to ignore not available devices of a complex configuration without defining the configuration as invalid. Further calculations or analyses include the corresponding NoValue.

The **Information** tab provides the information, which was read by the device hardware.

Calibration date

The calibration date shows the date of the last calibration.

Hardware version

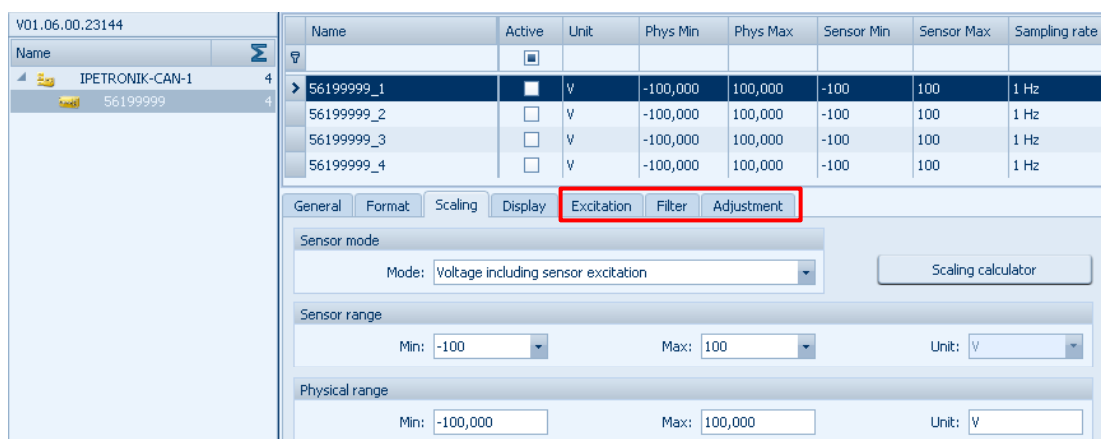The hardware version shows the current hardware version of the devices.

Firmware version

The firmware version shows the current firmware version of the devices.

5.4 Defining channels

5.4.1 Devices of the component group "Voltage/current"

Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate
56199999_1	☐	V	-100,000	100,000	-100	100	1 Hz
56199999_2	☐	V	-100,000	100,000	-100	100	1 Hz
56199999_3	☐	V	-100,000	100,000	-100	100	1 Hz
56199999_4	☐	V	-100,000	100,000	-100	100	1 Hz

V01.06.00.23144

Name Σ
IPETRONIK-CAN-1   4
56199999   4

General | Format | Scaling | Display | Excitation | Filter | Adjustment

Sensor mode
Mode: Voltage including sensor excitation   Scaling calculator

Sensor range
Min: -100   Max: 100   Unit: V

Physical range
Min: -100,000   Max: 100,000   Unit: V

Selecting one or several channels is optically signalized and the corresponding LED is flashing at the connected device.

Please note the following requirement to use this functionality:

- The *Allow accesses while configuring* option must be activated! (IPEmotion options 🌑 -> PlugIns -> Plugin specific options 🌑 -> Options -> Hardware accesses)

To define the settings for the **channel properties**, proceed as follows:

> ⚠️ *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

> ℹ️ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*

🔧 Select in the right window of the channel view the desired channel. You can find the **Offset** tab in the window of the configuration dialog. You have the ability to define settings to the offset compensation. An offset compensation defines the value compensation to a defined value for balancing an excitation offset. This defined value has to be within the maximum admissible physical range.

🔧 The **Excitation** tab offers settings of the sensor excitation. The sensor excitation defines the excitation for the respective connected channel.

🔧 The **Filter** tab offers the possibility to set the hardware filter and the averaging. The hardware filter defines the anti-aliasing filter for avoiding too high frequencies.

🔧 By using the **Adjust** tab you can define the following settings:

🔧 Mode

The mode defines the adjusting mode to be used.

🔧 Reference value

The reference value defines the value, which is recorded after an offset compensation.

🔧 Offset value

The offset value is only updated if the device is read with the *Detect* 🔍 function.

🔧 Run channel calibration

Start a channel calibration of one or several selected channels.

You have also the ability to calibrate with the context menu functionality. Mark the desired system or the corresponding device and open the context menu with the right mouse button. Select Extras and the desired calibration mode. There are the following modes available:

🔳 Calibrate all channels

🔳 Calibrate group Manual

🔳 Calibrate group 1

🔳 Calibrate group 2

🔳 Calibrate group 3

🔳 Calibrate group 4

> ⚠️ *Please note the following requirement to use this functionality:*
>
> *- The* Allow accesses while configuring *option must be activated! (IPEmotion options 🔍 -> PlugIns -> Plugin specific options 🔍 -> Options -> Hardware accesses)*

🔳 The **Mode** tab offers settings of the inversion. The inversion defines the acquisition range inversion of the input signal.

🔳 By using the **CAN timeout** tab you have the ability to select the following properties:

🔳 CAN timeout

The CAN timeout defines the seconds to send an alternate value if no message is received on the CAN bus.

🔳 Output value

The output value defines the alternate value to be send after a CAN timeout.

🔳 By using the **STG mode** tab you can define the following settings:

🔳 Bridge

You can define the following settings for the bridge: Type, Resistance, Connection. Define the bridge type, the bridge resistance, and the conductor count, which are connected to the bridge at the entry.

🔳 Shuntcheck

You can define the following settings for the Shuntcheck: Resistance, Quadrant. Define the resistance value for checking the respective quadrant of the bridge and the bridge quadrant to be checked.

5.4.2 Devices of the component group "Temperature"

Systems					Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate
Name		Type	▲	Σ		☐						
▲ IPETRONIK-1				48	› 56399999_1	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	56199999	M-SENS		4	56399999_2	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	51499999	SIM-DMS		10	56399999_3	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	51299999	SIM-SENS		10	56399999_4	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	51999999	SIM-STG		8	56399999_5	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	50599999	SIM-VIN		8	56399999_6	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	50299999	SIM-VOUT		8	56399999_7	☐	°C	-60,00	1370,00	-60	1370	1 Hz
▲ IPETRONIK-2				290	56399999_8	☐	°C	-60,00	1370,00	-60	1370	1 Hz
	56399999	μ-THERMO		8								
	56099999	M-THERMO		8								
	50899999	SIM-PT100		10								
	57099999	SIM-SBUS		240								
	53299999	SIM-TH II-8		8								
	53699999	SIM-TH II-8N		8								
	50199999	SIM-THERMO		8								
▲ IPETRONIK-3				4								
	59599999	CANpressure		2								
	59599990	CANpressure		2								
▲ IPETRONIK-4				10								
	56299999	M-FRQ		4								
	50499999	SIM-CNT		6								

General | Format | Scaling | Display | Thermo

Active: ☐
Name: 56399999_1
Description: Analog thermocouple acquisition input

To define the settings for the **channel properties**, proceed as follows:

⚠ *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

ℹ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*

Select in the right window of the channel view the desired channel. You can find the **Thermo** tab in the window of the configuration dialog. You have the ability to select the following properties:

Break detection

Activate or deactivate the conductor break detection for identifying error status. At a sensor break a defined value of –60 °C is set.

Averaging

Activate or deactivate averaging the data for reducing the noise components in the signal.

The **Mode** tab offers settings of the inversion. The inversion defines the acquisition range inversion of the input signal.

5.4.3 Devices of the component group "Pressure"

To define the settings for the **channel properties**, proceed as follows:

> ⚠️ *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

> ℹ️ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*

📲 Select in the right window of the channel view the desired channel. You can find the **Filter** tab in the window of the configuration dialog. The tab offers the possibility to set the hardware and software filter and the averaging. The hardware filter defines the anti-aliasing filter for avoiding too high frequencies. In addition, the software filter offers the following definition possibilities:

📲 Active

Activate or deactivate the use of the software filter.

📲 Type

The software filter type defines the filter characteristic.

📲 Frequency

The frequency defines the limit frequency of the software filter.

📲 By using the **Adjust** tab you have the ability to select the following properties:

📲 Mode

The mode defines the adjusting mode to be used.

Reference value

The reference value defines the value, which is recorded after an offset compensation.

Offset value

The offset value is only updated if the device is read with the *Detect* 🔧 function.

Run channel calibration

Start a channel calibration of one or several selected channels.

You have also the ability to calibrate with the context menu functionality. Mark the desired system or the corresponding device and open the context menu with the right mouse button. Select Extras and the desired calibration mode. There are the following modes available:

Calibrate all channels

Calibrate group Manual

Calibrate group 1

Calibrate group 2

Calibrate group 3

Calibrate group 4
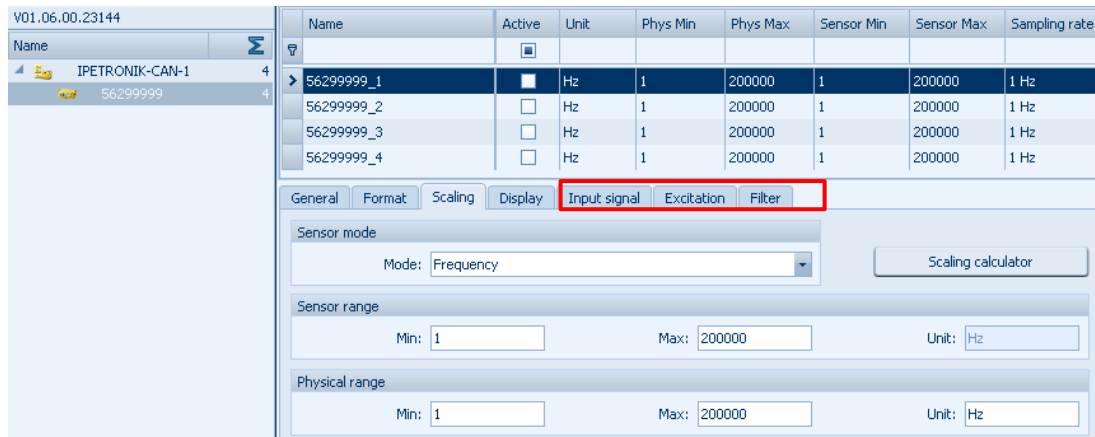
> ⚠️ *Please note the following requirement to use this functionality:*
>
> *- The* Allow accesses while configuring *option must be activated! (IPEmotion options* 🌐 *-> PlugIns -> Plugin specific options* 🌐 *-> Options -> Hardware accesses)*

5.4.4 Devices of the component group "Counter/frequency"

To define the settings for the **channel properties**, proceed as follows:

> ⚠ *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

> ⓘ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*

🔳 Select in the right window of the channel view the desired channel. You can find the **Input signal** tab in the window of the configuration dialog. You have the ability to select the following properties:

🔳 Threshold on

Threshold on defines the value to detect the entry signal as active.

🔳 Threshold off

Threshold off defines the value to detect the entry signal as inactive.

🔳 Edge

The edge defines the direction for detecting the pulse.

🔳 DC compensation

Activate or **deactivate** the compensation of a direct voltage offset of the signal.

🔳 Gate time

Define the time for recording the frequency.

⚙   Minimal value

⚙   The **Excitation** tab offers settings of the sensor excitation. The sensor excitation defines the excitation for the respective connected channel.

⚙   By using the **Filter** tab you have the ability to set the hardware filter. The hardware filter defines the anti-aliasing filter for avoiding too high frequencies.

⚙   The **Mode** tab offers settings of the inversion. The inversion defines the acquisition range inversion of the input signal.

⚙   By using the **Analog output** tab you can define the following settings:
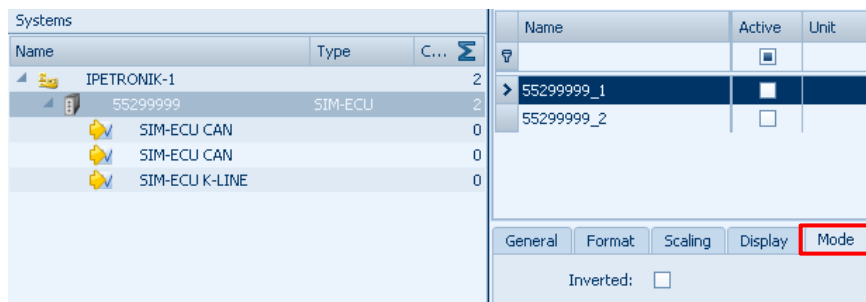
⚙   Min

Min defines the lower scaling limit of the analog excitation output.

⚙   Max

Max defines the upper scaling limit of the analog excitation output.

5.4.5 Devices of the component group "Communication"

To define the settings for the **channel properties**, proceed as follows:

> ⚠   *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

> ⓘ   *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*
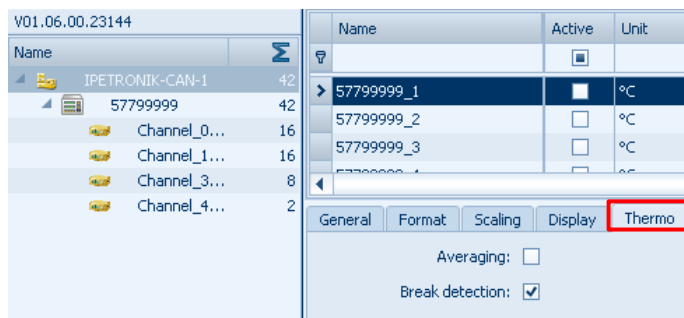
⚙   Select in the right window of the channel view the desired channel. You can find the **Mode** tab in the window of the configuration dialog. You have the ability to select the following properties:

⚙   Inverted

Activate/Deactivate the inversion of the acquisition range of the entry signal.

5.4.6 Devices of the component group "Multi devices"

To define the settings for the **channel properties**, proceed as follows:

> ⚠ *Please note that not all in the following listed tabs are available for each device. The respective available properties are defined depending on the selected device.*

> ℹ *Please find detailed information about the functionality and meaning of the following IPEmotion parameters in the IPETRONIK documentation IPEmotion: General, Format, Scaling, Display.*

🔳 Select in the right window of the channel view the desired channel. You can find the **Input signal** tab in the window of the configuration dialog. You have the ability to select the following properties:

🔳 Averaging

Activate/Deactivate averaging the values

🔳 Break detection

Activate/Deactivate the conductor break detection.